

REMARKS

Applicants appreciate the thoroughness with which the Examiner has examined the above-identified application. Reconsideration is requested in view of the amendments above and the remarks below.

Claim amendments

Claims 1, 2, 15 and 24 have been amended to recite that the paste is "flowable." Support is found in the specification at paragraph 0034, line 2. Additionally, claims 1, 2 and 15 have been amended to recite that the paste is applied in a "bead." Support is found in the specification at paragraph 0039, line 3 and in original claims 4-6. Claim 1 is further amended to recite that the bead is "discontinuous." Support is found in the specification at paragraph 0039, line 15, and in original claim 6. No new matter has been added.

Rejection of claim 1

Claim 1 stands rejected under 35 USC § 103 as being obvious from JP 02-177496 in view of Schafer U.S. Patent No. 5,863,620 and further in view of JP 02-108558 and JP 2002-166225.

Claim 1 is directed to the embodiment of the invention wherein the surface to which the paste is applied is on the roller. The JP 02-177496 reference shows the roller rolling the solder paste already on the surface of the printed circuit board. The Schafer patent discloses the application of liquid coating composition at an elevated temperature by forming troughs of the composition between metering rolls 2, 4 and applicator rolls 1, 3, respectively. The liquid coating is therefore applied uniformly to the entire surface of the applicator rolls. Since claim 1 now recites that the paste is

applied selectively, to only portions of the roller surface, the JP 02-177496 and Schafer references do not disclose or suggest applicants' method as recited in claim 1.

Likewise, the additional JP 02-108558 and JP 2002-166225 references do not render obvious the claimed method of selectively applying a discontinuous bead of flowable paste directly to a side of the roller surface facing the mask. Although the Examiner takes the position that these additional references disclose "applying a 'pattern' coating on a roller" (Office Action, pp.6 and 7), there is no disclosure of selectively applying a discontinuous bead of flowable paste as applicants claim. Accordingly, applicants' claim 1 is not obvious to one of ordinary skill in this art.

Rejection of claims 2, 4-9, 11-19 and 24

Claims 2, 4-9, 11-18 and 24 stand rejected under 35 USC § 103 as being obvious from JP 02-177496 in view of IBM Technical Disclosure Bulletin, April 1974, Vol. 16, No. 11, p.3564 "Roll Extrusion Filling of Small Vias" and further in view of Sullivan U.S. Patent No. 4,647,524. Claim 19 stands rejected under 35 USC § 103 as being obvious from JP 02-177496 in view of the IBM Technical Disclosure Bulletin and Sullivan, and further in view of Casey et al. U.S. Patent Publication No. 2002/009539. Applicants respectfully traverse these rejections.

Claims 2, 4-9, 11-19 and 24 are directed to the embodiment of the invention wherein the film or film strip is separate from the roller. Claims 2, 15 and 24 recite that a flowable paste is applied to a portion of side of the surface, film or film strip facing a mask over a circuit board, prior to the paste contacting the mask, and then using a roller to flow the paste on the surface, film or film strip into openings in the mask. Claims 2 and 15 further recite that the paste is applied in a bead to the film strip or film.

The JP 02-177496 reference shows the roller rolling the solder paste already on the surface of the printed circuit board, and the IBM Technical Disclosure Bulletin discloses the application of the paste on the mask over the green ceramic sheet prior to the placement of the top Mylar sheet. As the Examiner has acknowledged, the combination fails to teach "applying paste to a 'portion of side facing the mask', i.e., the underside of the film strip" (Office Action, p.3).

The Sullivan patent is cited for the aforementioned missing disclosure. However, the Sullivan patent does not teach applying a flowable paste to a film, and further does not teach rolling a surface containing paste over the mask. Instead, the Sullivan patent adheres a dry film photopolymer layer 14 to a polyester fabric screen 18, and then uses a squeegee to force the dry film photopolymer layer 14 onto a liquid polymer layer 19 on the board. Thus, Sullivan lacks any teaching or suggestion of applying a flowable paste to screen 18. Moreover, there is no suggestion that Sullivan's dry film application method may be used with a roller application, as applicants claim.

While the Examiner acknowledges that dry film photopolymer layer 14 "is different and is not supplied to a mask" and that the "supply" of the coating material is what is relied upon (Office Action, p.4), nevertheless the adhering of a dry film layer first to a screen and then to a liquid layer is fundamentally different from applicants' claimed application of flowable paste to a film and then to a mask. The hypothetical combination of Sullivan with the JP and IBM references is therefore a selective one, based not on any teachings in any of the references, but instead based on a hindsight reconstruction made with the benefit of applicants' own specification. Accordingly, claims 2, 15 and 24 are not obvious to one of ordinary skill in this art.

Additionally, the cited references in combination do not disclose or suggest applying a bead of the flowable paste to the film strip or film, as recited in claims 2 and 15. The Examiner has taken the position that "the application 'type' would be dependent on the desired end product and would be within the skill of the one practicing in the art" (Office Action, p.4). If this is so, applicants respectfully request that the Examiner either cite prior art showing this or submit an affidavit to this effect to complete the record in this application. Applicants submit that the invention as recited in claims 2 and 15 is not obvious from the cited prior art.

Likewise, it would not be obvious from the cited art to apply the paste in a bead across the surface, parallel to the roller axis (claim 4), in a continuous bead across the surface, parallel to the roller axis (claims 5 and 16), in a discontinuous bead across the surface, parallel to the roller axis (claims 6 and 17), or in a bead across the surface, parallel to the roller axis, at a variable rate of speed (claims 7 and 18). While the Examiner has dismissed these methods as being "within the skill of one practicing in the art" (Office action, p.4), applicants again submit that this is simply not the case and again respectfully request that the Examiner provide either examples by way of prior art or an affidavit to that effect.

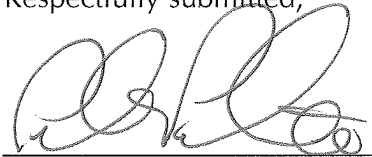
The cited combination of the JP, IBM and Sullivan references also does not disclose or suggest the subject matter of claim 14 (dependent on claim 2), namely, that velocity of the roller is varied to compensate for variations in bow wave volume or shear thinning of the paste.

Since the cited references separately or in combination do not disclose or suggest applicants' aforementioned methods, applicants' claims 2, 4-9, 11-19 and 24 are not obvious to one of ordinary skill in the art.

Applicants have currently or previously amended claims 1, 2, 15 and 24 and have cancelled claims 3, 10, 20-23 and 25 from further consideration in this application. Applicants are not conceding in this application that the claims as they stood prior to amendment are not patentable over the art cited by the Examiner, as the present claim amendments and cancellations are only for facilitating expeditious prosecution and allowance of the claims. Applicants respectfully reserve the right to pursue these prior and other claims in one or more continuation and/or divisional patent applications.

It is respectfully submitted that the application has now been brought into a condition where allowance of the entire case is proper. Reconsideration and issuance of a notice of allowance are respectfully solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'P. W. Peterson', written over a horizontal line.

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